HbA1c are likely to lead to substantial clinical and economic benefits, driven by reduced complication rates. The cost-effectiveness of interventions designed to improve glycemic control in Saudi Arabia is worthy of investigation.

PDB36

AN EVALUATION OF THE LONG-TERM COSTS AND EFFECTS OF A 1% REDUCTION IN HBA1C IN TYPE 2 DIABETES PATIENTS IN MALAYSIA

Shafie AA[1], Kareem F[2], Hussein Z[3], Smith-palmer J[4], Hunt B[4], Todorova L[5]
[1]Universiti Sains Malaysia, Penang, Malaysia, [2]Novo Nordisk International Operations, Selangor, Malaysia, [3]Hospital Putrajaya, Putrajaya, Malaysia, [4]Ossian Health Economics and Communications, Basel, Switzerland, [5]Novo Nordisk International Operations, Zurich, Switzerland

OBJECTIVES: A1chieve is a prospective, international, observational study of basal, bolus and biphasic insulin analogues in routine clinical practice. The present analysis aimed to evaluate the economic and clinical benefits associated with a 1% reduction in HbA1c (relative to no change in HbA1c) in Malaysian A1chieve patients. **METHODS:** Life expectancy, complication rate and the cost of complications were projected over a 35-year time horizon using the published CORE Diabetes Model. At baseline, the mean (standard deviation) age of the cohort was 54 years (11 years), duration of diabetes was 12 (8) years, HbA1c was 10% (1.8%) and body mass index was 28.1 (5.1) kg/m2. HbA1c was reduced by 1%-point in the active group versus the control group. Costs were reported in 2011 Malaysian Ringgits (MYR) and converted to 2011 Euros (EUR) using the mid-market exchange rate on June 30, 2011. Future costs and clinical outcomes were discounted annually at a rate of 3.5%. **RESULTS:** A 1% reduction in HbA1c was associated with reduced costs of treating diabetes complications and an increase in life expectancy. Undiscounted life expectancy was improved by 0.36 years following HbA1c reduction (7.53 versus 7.17 years). The time alive and free of any diabetes complications increased from 0.31 years to 0.40 years in the HbA1creduction group. Over patient lifetimes, improved HbA1c was associated with cost savings of EUR 682 [MYR 3,067] (EUR 2,745 [MYR 13,607] versus EUR 3,427 [MYR 16,674]). The greatest cost savings were associated with renal complications avoided. **CONCLUSIONS:** The A1chieve study has shown that glycemic control is generally poor in routine clinical practice in Malaysia. The present analysis showed that improved glycemic control would be likely to bring substantial clinical and economic benefits to these patients, arising primarily from reduced incidence of diabetes complications.

PDB37

COST-EFFECTIVENESS OF ADDING TWICE-DAILY EXENATIDE TO BASAL INSULIN IN PATIENTS WITH TYPE 2 DIABETES IN SCOTLAND

Varol N[1], Wilson BP[2], Norrbacka K[3], Valentine WJ[4], Pollock RF[4]
[1]Eli Lilly and Company, Surrey, UK, [2]Lilly UK, Hampshire, UK, [3]Oy Eli Lilly Finland AB, Helsinki, Finland, [4]Ossian Health Economics and Communications, Basel, Switzerland

OBJECTIVES: To estimate the long-term cost-effectiveness of adding twice-daily exenatide (BID) to basal insulin in patients with type 2 diabetes from the perspective of NHS Scotland. Data from GWCO, a phase III, double-blind, randomized, placebo-controlled trial, comparing the efficacy of adding exenatide BID to titrated insulin glargine versus titrated insulin glargine alone, was used for the modelling analysis. After 30 weeks, exenatide BID added to glargine was associated with greater mean HbA1c reduction (-1.71% vs. -1.00%, $p<0.001$) and weight reduction (-1.78 kg vs. +0.96 kg, $p<0.001$) compared to glargine alone. **METHODS:** A previously published and validated diabetes model (IMS CORE Diabetes Model) was used to project 20-year clinical and cost outcomes based on the GWCO cohort (age 59 years, diabetes duration 12.3 years, HbA1c 8.41%) and efficacy and safety outcomes from the GWCO trial. Costs were derived from published sources and expressed in 2011 Pounds Sterling (£). An annual discount rate of 3.5% was applied to future costs and clinical benefits. **RESULTS:** In the base-case analysis exenatide BID plus glargine was projected to improve quality-adjusted life expectancy by 0.183 quality-adjusted life years (QALYs) and life expectancy by 0.147 years compared to glargine alone, at an additional cost of £1,721. The resulting cost per QALY was £9,411. Increased pharmacy costs were partially offset by reduced costs associated with diabetes complications with exenatide BID. Assuming a willingness-to-pay of £20,000 per QALY gained, exenatide BID had a 99.8% probability of being cost-effective. Sensitivity analyses showed that results were robust to variation in range of model parameters. **CONCLUSIONS:** Based on results from GWCO clinical trial, exenatide BID plus glargine is projected to be a cost-effective use of NHS Scotland resources compared to glargine alone.

PDB38

COST-EFFECTIVENESS OF INSULIN DETEMIR IN PEOPLE WITH TYPE 2 DIABETES IN ROMANIA

Ionescu–Targoviste C[1], Wrona W[2], Schubert A[3], Niewada M[2], Czech M[3]
[1]National Institute of Diabetes "Nicolae Paulescu", Bucharest, Romania, [2]HealthQuest Sp z o.o. Sp. k., Warsaw, Poland, [3]Novo Nordisk Pharma Sp z.o.o., Warsaw, Poland

OBJECTIVES: To assess cost-utility of switching type 2 diabetes patients to an insulin detemir-based regimen after failure to achieve adequate control on 1) oral antidiabetic agents (OADs) alone, or OAD in combination with 2) neutral protamine Hagedorn (NPH) insulin, or 3) insulin glargine in Romania. **METHODS:** The CORE Diabetes Model was used to model the long-term consequences. Efficacy results at the beginning and at the end of the study as well as baseline demographics of the patient cohort (subgroup analysis of the German cohort of PREDICTIVE study) were used. The perspective was the health care services payer over life time (35-years). The analysis used model default health state utility values. Cost data were derived from DRG Data from the Center for Research and Evaluation of Healthcare Services (Romania), CaNaMed National Catalogue of Medicines Prices (official tariff lists) and expert opinion. **RESULTS:** In the 1st analysis (insulin detemir ± OADs vs. OADs) QALYs increased by 0.399 years with insulin detemir. Total lifetime costs increased by EUR 4,413 resulting in an incremental cost per QALY gained of EUR 11,050. In the 2nd analysis insulin detemir increased quality-adjusted life expectancy by 0.394 QALYs and total costs by EUR 2,340, with incremental cost per QALY gained of EUR 5,943. Transferring from insulin glargine ± OADs to insulin detemir ± OADs (3rd analysis) increased QALYs by 0.319 years. Total costs increased by EUR 689 resulting in an incremental cost per QALY gained of EUR 2,160. **CONCLUSIONS:** Based on efficacy data from an observational study and a validated health economics model, insulin detemir was cost effective when compared to OAD alone, or insulin NPH ± OAD, or insulin glargine ± OAD for the treatment of type 2 diabetes in the Romanian health care setting.

PDB39

EVALUATION OF THE LONG-TERM CLINICAL AND ECONOMIC IMPACT OF A 1% HBA1C REDUCTION IN PATIENTS WITH TYPE 2 DIABETES IN INDONESIA

Todorova L[1], Soewondo P[2], Hunt B[3], Suastika K[4]
[1]Novo Nordisk International Operations, Zurich, Switzerland, [2]University of Indonesia, Jakarta, Indonesia, [3]Ossian Health Economics and Communications, Basel, Switzerland, [4]University of Udayana, Bali, Indonesia

OBJECTIVES: Optimal glycemic control is a key goal in patients with type 2 diabetes and is pivotal in reducing the risk of diabetes-related complications. The aim of the present study was to investigate long-term clinical and economic benefits of a 1% reduction in HbA1c versus baseline levels in patients enrolled in the A1chieve study (an international, prospective, observational study of insulin use within routine clinical practice) in the Indonesian setting. **METHODS:** The analysis was performed using the published and validated CORE Diabetes Model over a time horizon of 35 years with future costs and clinical benefits were discounted at a rate of 3% per annum. At baseline patients had a mean HbA1c of 9.8%, the analysis compared patients outcomes in which HbA1c remained at 9.8% in comparison with reducing mean HbA1c by 1%; mean HbA1c was assumed to remain unchanged throughout the simulation. Direct costs are presented in IDR (converted to EUR at a rate of 1 EUR=11,831 IDR). **RESULTS:** A 1% reduction in HbA1c from baseline led to improvements in life expectancy and quality-adjusted life expectancy. Reducing HbA1c from 9.8% to 8.8% improved life expectancy from 10.07 years to 10.69 years (difference 0.61 years) and quality-adjusted life expectancy from 6.56 quality-adjusted life years (QALYs) to 7.04 QALYs (difference 0.48 QALYs). Mean direct costs were also IDR 6,403,196 (EUR 541) lower in the reduced HbA1c group (IDR 242,721,221 [EUR 20,551] versus IDR 236,318,025 [EUR 20,026]), with the biggest driver of cost savings being the reduced incidence of renal complications in the reduced HbA1c group. **CONCLUSIONS:** Baseline glycemic control in patients with diabetes in the Indonesian setting was sub-optimal; however, a 1% reduction in HbA1c from baseline was associated with improved life expectancy and quality-adjusted life expectancy as well as being cost-saving over a 35-year time horizon.

PDB40

THE IMPORTANCE OF HBA1C EVOLUTION IN COST-EFFECTIVENESS MODELING OF TYPE 2 DIABETES MELLITUS (T2DM)

Willis M[1], He J[2], Neslusan C[2], Johansen P[1], Worbes-cerezo M[3]
[1]The Swedish Institute for Health Economics, Lund, Sweden, [2]Janssen Global Services LLC, Raritan, NJ, USA, [3]Janssen-Cilag SA, Madrid, Madrid, Spain

INTRODUCTION: In T2DM, HbA1c tends to drift up over time and the extent to which anti-hyperglycemic agents can maintain initial glucose lowering effect (or durability) varies. HbA1c evolution is an important determinant of future outcomes and costs. Currently there is no consensus on how to model upward drift in HbA1c or the durability of treatments. **OBJECTIVES:** Review different approaches to modeling HbA1c evolution and assess their impact on economic evaluations of T2DM interventions. **METHODS:** We reviewed the ways in which HbA1c evolution has been modeled. Lifetime simulations were performed that compared two hypothetical treatments: 1) initial HbA1c reduction of 1.25% and annual cost of $1,000 and 2) initial HbA1c reduction of 1% and annual cost of $200, using ECHO-T2DM, a validated micro-simulation model. . Treatment was intensified in both arms when HbA1c exceeded 7.0%, first by adding basal insulin and subsequently by adding 3x daily short-acting insulin. **RESULTS:** Four different approaches were identified: (1) no HbA1c evolution; (2) constant increase in HbA1c, irrespective of treatment; (3) constant treatment-specific increase in HbA1c; and (4) non-linear increase in HbA1c, irrespective of treatment. The simulations confirmed that these assumptions are critical. While the incremental life-years (LY's) and Quality-Adjusted LYs (QALYs) were similar in the first 3 scenarios, the absolute values were highest for (1). Cost-savings and QALY gains were largest in (3), which allowed HbA1c to drift apart over time in each arm, and smallest in (2) (because treatment intensification reduced the HbA1c gap). The incremental cost-effectiveness ratio (ICER) ranged from $3,196 in (3) to $32,444 in (2). (4) could not be implemented in this version of ECHO-T2DM. **CONCLUSIONS:** Assumptions used to model HbA1c evolution have important consequences for estimates of cost-effectiveness, a 10-fold difference in the ICER in this hypothetical example, and should be addressed with sensitivity analysis in health economic evaluations.

PDB41

LONG-TERM EVALUATION OF THE ECONOMIC IMPACT OF REDUCING HBA1C BY 1% IN TYPE 2 DIABETES PATIENTS IN ALGERIA

Roca P[1], Lamri L[2], Belhadj M[3], Pollock RF[4], Valentine WJ[5], Todorova L[6]
[1]Novo Nordisk International Operations, Algiers, Algeria, [2]University of Algiers, Algiers, Algeria, [3]EHU d'Oran, Oran, Algeria, [4]Ossian Health Economics and Communications, Basel, Switzerland, [5]Ossian Health Economics and Communications, Basel, Basel, Switzerland, [6]Novo Nordisk International Operations, Zurich, Switzerland

OBJECTIVES: To investigate the economic benefits of a 1% reduction in HbA1c in comparison with baseline levels in patients with type 2 diabetes in Algeria enrolled

in the A1cheive study. **METHODS:** The CORE Diabetes Model was used to make long-term projections of clinical and cost outcomes associated with a 1% HbA1c reduction based on A1chieve, a global, prospective, observational study of basal, mealtime and biphasic insulin analogs in routine clinical practice. At baseline, mean (SD) patient age was 60 (10) years, duration of diabetes 12 (5) years and HbA1c 9.2 (1.8)%. HbA1c was reduced by 1%-point from baseline in the active group relative to the control group. Life expectancy, complication rates and the cost of complications were projected of a 35-year time horizon. Future costs and clinical outcomes were discounted at 3% annually. Costs are presented in 2011 Algerian Dinar (DZD), converted to Euros (EUR) at an exchange rate of DZD 1:EUR 0.096. **RESULTS:** A 1% reduction in HbA1c was associated with improvements in both clinical and economic outcomes. Undiscounted life expectancy was improved by 0.17 year with a 1% improvement in HbA1c (6.58 versus 6.40 years). The cumulative incidence of all diabetes related complications included in the analysis was lower in the 1% HbA1c reduction group. Complication costs were DZD 9,669 (EUR 93) lower following HbA1c reduction (DZD 387,236 [EUR 3,717] versus DZD 396,905 [EUR 3810]). The most pronounced difference was in the cost of renal complications. **CONCLUSIONS:** Glycemic control in A1chieve patients was generally suboptimal in the Algerian setting. Improvements in glycemic control are likely to lead to substantial clinical and economic benefits due to reduced complication rates. Consequently, the cost-effectiveness of intensifying treatment in these patients is worthy of further analysis.

PDB42

EVALUATING THE CLINICAL AND COST OUTCOMES ASSOCIATED WITH IMPROVING GLYCEMIC CONTROL IN TYPE 2 DIABETES PATIENTS IN INDIA

Todorova L[1], Shah SN[2], Valentine WJ[3]
[1]*Novo Nordisk International Operations, Zurich, Switzerland,* [2]*Bhatia Hospital, Mumbai, India,* [3]*Ossian Health Economics and Communications, Basel, Basel, Switzerland*

OBJECTIVES: Diabetes represents a huge health care challenge for India. Estimates suggest that there are over 61 million people living with diabetes in India (prevalence of 9.2% in adults), and diabetes caused approximately 983,000 deaths in 2011. The aim of this study was to evaluate the benefits in long-term clinical and cost outcomes associated with improving glycemic control in type 2 diabetes patients in India. **METHODS:** Cohort characteristics were based on Indian patients in A1chieve, a global, observational, prospective study of insulin analogs in daily clinical practice. At baseline, patients had a mean (standard deviation) age of 51.8 (10.1) years, duration of diabetes of 6 (4.6) years and glycated hemoglobin (HbA1c) of 8.3% (1.4%). A published and validated model of type 2 diabetes (CORE Diabetes Model) was used to make long-term projections of clinical outcomes and direct costs (2011 Indian Rupees [INR], converted to Euros [EUR] at INR 0.015=EUR 1). Future costs and clinical benefits were discounted at 3% annually. **RESULTS:** Over a 35-year time horizon, reducing HbA1c by 1% was projected to improve mean life expectancy by 0.64 years (10.95 versus 11.59 years) and quality-adjusted life expectancy by 0.53 QALYs (7.36 versus 7.89 QALYs). Benefits were driven by lower complication rates with improved glycemic control. End-stage complications such as myocardial infarction, end-stage renal disease, severe vision loss and lower limb amputation were reduced by 4%, 46%, 33% and 3%, respectively (relative risk). Direct costs were reduced by INR 33,443 (EUR 502) due to complications avoided control (INR 256,101 [EUR 3,842] versus INR 222,659 [EUR 3,340]). **CONCLUSIONS:** HbA1c levels are above guideline targets in India. Improving glycemic control is likely to substantially lower the risk of complications, improve survival and reduce complication costs. Cost-effectiveness analyses of interventions/management programs designed to improve glycemic control are merited for the Indian setting.

PDB43

ECONOMIC EVALUATION OF VILDAGLIPTIN COMPARED TO GLIMEPIRIDE AS ADD-ON TO METFORMIN FOR THE TREATMENT OF DIABETES MELLITUS TYPE 2 PATIENTS IN GREECE

Hatzikou M[1], Rombopoulos G[1], Yfantopoulos J[2]
[1]*Novartis Hellas, Metamorfosis, Greece,* [2]*National and Kapodistrian University of Athens, Athens, Greece*

OBJECTIVES: Evaluate the cost-utility (CUA) of vildagliptin or sulphonylurea as add on to metformin treatment for DMII patients for the Greek NHS **METHODS:** A validated patient level simulation model was used based on UKPDS risk equations (Clarke 2004) to estimate long run micro/macro-vascular complications and mortality over a lifetime horizon. During each cycle a patient can experience different complications: ischemic heart disease, myocardial infarction (MI), chronic heart failure, renal failure, stroke, amputation, blindness in one eye. The outcomes assessment criteria were Quality Adjusted Life Years (QALYs) and Life Years Gained (LYG). Quality of life decrements were derived from literature. Discount rates of 3.5% were set for both costs and outcomes and univariate sensitive analysis was conducted. Drug costs were based on Greek published list prices 2012, while complication cost was obtained from International literature. **RESULTS:** The mean number of QALYs per patient in the lifetime horizon was 6.24 in the vildagliptin&metformin group and 6.16 in sulphonylurea&metformin group, resulting in 0.08 QALYs in favor of vildagliptin&metformin group. Total costs per patient were €7,848 in vildagliptin&metformin group and €7,572 for sulphonylurea&metformin, resulting in €276 cost difference for the latter. The incremental cost effectiveness ratio (ICER) for vildagliptin&metformin versus sulfonylurea&metformin is estimated at €3.371 per QALY for a lifetime horizon. Regarding the analysis on life years gained, vildagliptin&metformin group had on average 8,01 LYG and sulphonylurea&metformin 7,93, leading to a difference of 0.08 years in favour of vildagliptin&metformin. ICER for vildagliptin&metformin versus sulfonylurea&metformin is estimated at €3.424 per life years gained. **CONCLUSIONS:** For the Greek NHS adding Vildagliptin to Metformin is projected to be highly cost-effective for patients with type 2 diabetes who are not at HbA1C goal on Metformin compared to adding SU to Metformin. The price difference of the two comparators is bridged when complications' cost is included in the analysis.

PDB44

LONG-TERM EVALUATION OF THE ECONOMIC IMPACT OF REDUCING HBA1C BY 1% IN TYPE 2 DIABETES PATIENTS IN MEXICO

Todorova L[1], González-Gálvez G[2], Pollock RF[3]
[1]*Novo Nordisk International Operations, Zurich, Switzerland,* [2]*Instituto Jalisciense de Investigacion en Diabetes y Obesidad, Guadalajara, Mexico,* [3]*Ossian Health Economics and Communications, Basel, Switzerland*

OBJECTIVES: Achieving glycemic control forms the cornerstone of type 2 diabetes management and is key in reducing diabetes-related complications. The aim of the current analysis was to investigate the long-term clinical and economic benefits of a 1% reduction in HbA1c in comparison with baseline levels for type 2 diabetes patients enrolled in the A1chieve study (an international, prospective, observational study of insulin analogs within routine clinical practice) in the Mexican setting. **METHODS:** The analysis was performed using the published and validated CORE Diabetes Model, over a 35-year time horizon, with future costs and clinical outcomes discounted at a rate of 3% per annum. At baseline, mean (SD) patient age was 55(13) years, duration of diabetes 11(7.5) years and HbA1c 10.3(2.2)%. An HbA1c reduction of 1% was applied in the active arm, after which it was assumed that HbA1c remained constant. Captured costs included diabetes-related complications and concomitant medications. Costs of antihyperglycemic treatment and adverse events were not included. Costs are presented in 2011 Mexican Pesos (MXN) and converted into Euros (EUR) (MXN 1 to EUR 0.058). **RESULTS:** A 1% reduction in HbA1c was associated with increased life expectancy of 0.51 years (8.70 years versus 8.19 years) and reduced cumulative incidence of all modelled diabetes-related complications. Total mean direct costs were MXN 41,875 (EUR 2,429) lower in patients with HbA1c of 9.3% versus those with HbA1c remaining at 10.3% (MXN 596,985 [EUR 34,625] versus MXN 638,860 [EUR 37,054]). This was driven by savings from the reduced incidence of complications. **CONCLUSIONS:** Baseline glycemic control in A1chieve type 2 diabetes patients in the Mexican setting was generally poor. Even modest improvements in HbA1c are likely to lead to substantial clinical and economic benefits, due to reduced complication rates. Consequently, the cost-effectiveness of intensifying treatment is worthy of further analyses.

PDB45

COST-EFFECTIVENESS OF VILDAGLIPTIN COMPARED TO GENERIC SULPHONYLUREAS ADDED ON TO METFORMIN FROM THE PORTUGUESE SOCIETAL PERSPECTIVE

Calado F[1], Gruenberger JB[2], Silva-nunes J[3], Carvalho D[4]
[1]*Novartis, Sintra, Portugal,* [2]*Novartis, Basel, Switzerland,* [3]*Curry Cabral Hospital, Lisboa, Portugal,* [4]*S. João Hospital / Faculty of Medicine, Porto, Portugal*

OBJECTIVES: Vildagliptin has demonstrated efficacy on HbA1c comparable to glimepiride after 2 years of add-on treatment to metformin with markedly reduced hypoglycemic risk. The current analysis aims to assess the add-on of vildagliptin versus generic sulphonylureas (SUs) to metformin using a cost-effectiveness analysis (CEA) framework from the Portuguese societal perspective. Whilst generic SUs have a lower acquisition price, hypoglycemic events represent a significant economic burden and therefore the CEA framework can contribute to better decision-making. **METHODS:** The CEA utilized a patient level simulation model building on the UKPDS risk equations to estimate micro/macro-vascular complications and mortality over a lifetime horizon. Clinical parameters in the current model include: HbA1c levels, weight gain, systolic blood pressure, total cholesterol, HDL and incidence of hypoglycemic events. Patient distribution on demographic and clinical variables was based on Portuguese epidemiological data. The treatment algorithm allows for treatment switch when: HbA1c goal is not met; drug intolerance; poor compliance. Drug parameters and quality of life decrements were derived from literature. Drug costs were based on Portuguese list prices, while the unit cost of each complication was obtained from the Diagnosis Related Groups tariff. **RESULTS:** On average, the add-on of vildagliptin was estimated to result in a per patient gain of 0.11 QALY and an increase of €1,453 on total cost when compared to the add-on of SU to metformin, resulting in an incremental cost-effectiveness ratio of €12,794/QALY. **CONCLUSIONS:** Under the Portuguese societal perspective, adding vildagliptin is projected to be likely cost-effective for patients with type 2 diabetes who are not at HbA1c goal on metformin compared with adding generic SUs.

PDB46

ANTI-DIABETIC DRUGS AND IN-PATIENT ADMISSIONS ATTRIBUTABLE TO DIABETES IN PORTUGAL

Gouveia M[1], Laires P[2], Borges M[3], Augusto M[4], Martins AP[2]
[1]*Catholic University of Portugal, Lisbon, Portugal,* [2]*Merck, Sharp & Dohme, Oeiras, Portugal,* [3]*University of Lisbon, Lisbon, Portugal,* [4]*CEA, Católica Lisbon School of Business and Economics, Lisbon, Portugal*

OBJECTIVES: Despite the growing incidence of diabetes, the occurrence of complications requiring hospitalization has stabilized in the last decade. Advances in health care and improved access to innovative drugs may have led to these health gains. We aimed to explore the relationship between patients' access to newer oral anti-diabetic drugs (OADs) and the number and costs of hospitalizations attributable to diabetes. **METHODS:** For the period 2000-2009, we collected data on: 1) the number of hospital admissions and their costs attributable to diabetes; 2) the number of patients treated for diabetes per year and health region, based on the OADs consumption ("treated prevalence"); and 3) the evolution of the average "vintage"